**Capital Punishment and the Deterrence of Crime**

Written Testimony for the
House Judiciary Committee, Subcommittee on Crime, Terrorism, and Homeland Security,
Hearing on  H.R. 2934, the "Terrorist Penalties Enhancement Act of 2003,"
April 21, 2004, at 2:00 p.m.

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## I.  Introduction and Summary

Recent research on the relationship between capital punishment and crime has created

a strong consensus among economists that capital punishment deters crime.  Early studies

from the 1970s and 1980s reached conflicting results.  However, recent studies have

exploited better data and more sophisticated statistical techniques.  The modern studies have

consistently shown that capital punishment has a strong deterrent effect, with each execution

deterring between 3 and 18 murders.  This is true even for crimes that might seem not to be

deterrable, such as crimes of passion.

No research has yet focused specifically on whether capital punishment deters

terrorism.  It is conceivable that some terrorists are undeterrable, as are some who commit

other murders.  Indeed, the application of the death penalty might conceivably induce some

terrorist acts, as terrorists seek martyrdom.  However, the pervasive consistency of capital

punishment's deterrence of other kinds of murder suggests that capital punishment would

deter at least some terrorist murders.

One caution: that capital punishment deters murder does not necessarily demonstrate

that imposing capital punishment is good policy.  In addition to the benefits from deterrence,

other factors must also be considered, such as capital punishment's morality, the socio-

economic patterns with which executions are imposed, and the dangers of executing the innocent. These other factors are beyond this testimony's scope.

I proceed as follows. After Part II explains my qualifications, Part III discusses early research on whether capital punishment deters crime. Part IV describes modern studies, and Part V discusses the degree to which current research can be applied to terrorism.

## II. My Background and Qualifications.

I received my Ph.D. in Economics from Emory University in 2002, with fields of specialization in Law & Economics and Econometrics. Since then, I have been on the faculty at the John E. Walker Department of Economics at Clemson University, in Clemson, South Carolina. I am currently beginning an appointment at the Emory University School of Law, in Atlanta, Georgia. I will also teach in Emory's economics department. I have frequently published articles in peer-reviewed journals, and I have published a book.

The primary focus of my research has been the empirical analysis of crime. One of my research interests has been on whether capital punishment deters crime. I have published three articles on the topic in peer-reviewed journals, and I have another working paper underway. I am also in the process of creating a related book. I have presented this research widely around the country at seminars and professional meetings. I have also discussed the work frequently in the popular media, including internationally on BBC radio. My research on capital punishment and deterrence places me among the leading experts on the issue.

**III. Early Literature on Capital Punishment and Deterrence.**

In the U.S., the deterrence issue has been a topic of hot debate for decades. The initial participants in the debate were psychologists and criminologists. Their research was either theoretical or based on comparisons of crime patterns in states with and without capital punishment. However, because they did not use multiple-regression statistical techniques, the analyses were unable to distinguish the effect on murder of capital punishment from the effects of other factors.[1]

The debate in the economics literature began with Isaac Ehrlich's two papers in 1975 and 1977.[2] Ehrlich was the first to study capital punishment's deterrent effect using multivariate regression analysis. In contrast to earlier methods, this approach allowed Ehrlich to separate the effects of many different factors on murder.

Ehrlich's 1975 paper examined U.S time-series data for the period 1933-1969. Time-series data are data for one unit (for Ehrlich, for the entire U.S.) over several time periods. He tested the effect on national murder rates of deterrent variables (the probabilities of arrest, conviction, and execution), demographic variables (population, fraction of nonwhites, fraction of people age 14-24), economic variables (labor force participation, unemployment rate, real per capita permanent income, per capita government expenditures, and per capita expenditures on police), and a time variable. He found a statistically significant negative relationship between the murder rate and execution rate, indicating a deterrent effect. Specifically, he estimated that each execution resulted in approximately seven or eight fewer murders.

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[1] For example, J.T. Sellin, J. T., The Death Penalty (1959); H. Eysenck, Crime and Personality (1970).
[2] Isaac Ehrlich, The Deterrent Effect of Capital Punishment: A Question of Life and Death, 65 Am. Econ. Rev. 397 (1975); Isaac Ehrlich, Capital Punishment and Deterrence: Some Further Thoughts and Additional Evidence, 85 J. Pol. Econ. 741 (1977)

Ehrlich's 1977 paper studied cross-sectional data from the fifty states in 1940 and 1950. That is, instead of his first paper's approach testing how the total U.S. murder rate changed across time as the execution rate changed, Ehrlich now explored the relationship during a single year between each of the states' execution rates and their murder rates. Cross-sectional data are data from several units (here, the fifty states) for one time period (1940 or 1950).

Again, Ehrlich used multivariate regression analysis to separate the effect on murder of different factors. He included deterrent variables (probabilities of conviction and execution, median time spent in prison, and a dummy variable distinguishing executing states from non-executing states), demographic variables (state population, urban population, percent of nonwhites, and percent of people age 15-24 and 25-34), and economic variables (median family income and percent of families with income below half of the median income). Again, his findings indicated a substantial deterrent effect of capital punishment on murder.

Ehrlich's finding loosed a flood of interest in econometric analysis of capital punishment and deterrence. The papers that immediately followed Ehrlich used his original data (1933-1969 national time-series or 1940 and 1950 state level cross section) and variants of his econometric model. Many found a deterrent effect of capital punishment, but others did not. For example, using Ehrlich's data, all of the following found a deterrent effect: Yunker, Cloninger, and Ehrlich and Gibbons.[3] In contrast, Bowers and Pierce; Passel and Taylor; and Hoenack and Weiler find no deterrence when they use the same data with

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[3] James A. Yunker, Is the Death Penalty a Deterrent to Homicide? Some Time Series Evidence, 5 Journal of Behavioral Economics 45 (1976); Dale O. Cloninger, Deterrence and the Death Penalty: A Cross-Sectional Analysis, 6 Journal of Behavioral Economics 87 (1977); Isaac Ehrlich & Joel Gibbons, On the Measurement of the Deterrent Effect of Capital Punishment and the Theory of Deterrence, 6 Journal of Legal Studies 35 (1977).

alternative specifications.[4]  Similarly, McAleer and Veall, Leamer, and McManus, find no

deterrent effect when different variables are included over the same sample period.[5]  Finally,

Black and Orsagh find mixed results depending on the cross-section year they use.[6]

In the late 1980s and 1990s, a second-generation of econometric studies extended

Ehrlich's national time-series data or used more recent cross-sectional data.  As before, some

papers found deterrence while others did not.  For example, Layson and Cover and Thistle

use an extension of Ehrlich's national time-series data, covering up to 1977.[7]  Although

Layson finds a significant deterrent effect of executions, Cover and Thistle correct for data

flaws -- nonstationarity -- and find no deterrent effect.  Chressanthis employs national time-

series data covering 1966 through 1985 and finds a deterrent effect.[8]  In contrast, Grogger

uses daily data for California during 1960-1963 and finds no deterrent effect.[9]

However, most of the early studies—both the first wave and the second

generation—suffered from fundamental flaws: they suffered important data limitations

because they used either national time-series or cross-section data.  Using national time-

series data created a serious aggregation problem.  Any deterrence from an execution

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[4] W. J. Bowers & J.L. Pierce, The Illusion of Deterrence in Isaac Ehrlich's work on Capital Punishment, 85 Yale Law Journal 187 (1975); Peter Passell & John B. Taylor, The Deterrent Effect of Capital Punishment: Another View, 67 American Economic Review 445 (1977); Stephen A. Hoenack & William C. Weiler, A Structural Model of Murder Behavior and the Criminal Justice System, 70 American Economic Review 327 (1980).
[5] Michael McAleer & Michael R. Veall, How Fragile are Fragile Inferences? A Re-Evaluation of the Deterrent Effect of Capital Punishment, 71 Review of Economics and Statistics 99 (1989); Edward E. Leamer, Let's Take the Con out of Econometrics, 73 American Economic Review 31 (1983); Walter S. McManus, Estimates of the Deterrent Effect of Capital Punishment: The Importance of the Researcher's Prior Beliefs, 93 Journal of Political Economy 417 (1985).
[6] T. Black & T. Orsagh, New Evidence on the Efficacy of Sanctions as a Deterrent to Homicide, 58 Social Science Quarterly 616 (1978).
[7] Stephen A. Layson, Homicide and Deterrence: A Reexamination of the United States Time-Series Evidence, 52 Southern Economic Journal 68 (1985); James P. Cover & Paul D. Thistle, Time Series, Homicide, and the Deterrent Effect of Capital Punishment, 54 Southern Economic Journal 615 (1988).
[8] George A. Chressanthis, Capital Punishment and the Deterrent Effect Revisited: Recent Time-Series Econometric Evidence, 18 Journal of Behavioral Economics 81 (1989).
[9] Jeffrey Grogger, The Deterrent Effect of Capital Punishment: An Analysis of Daily Homicide Counts, 85 J. of the American Statistical Association 295 (1990).

should affect the crime rate only in the executing state; one state's high execution rate would not be expected to change the rate in nearby states, where the first state's laws and courts lack criminal jurisdiction.

Aggregation dilutes such distinct effects, creating "aggregation bias." For example, suppose that the following happens concurrently: the murder rate in a state with no executions randomly increases at the same time that the murder rate drops in a state with many executions. Aggregate data might incorrectly lead to an inference of no deterrence; the aggregate data, with the two states lumped together, would show an increase in executions leading to no change in the murder rate.

Cross-sectional studies also suffer serious problems. Most importantly, they preclude any consideration of what happens to crime, law enforcement, and judicial processes over time. Cross-section data also prevent researchers from controlling for jurisdiction-specific characteristics that could be related to murder, such as a violent culture in southern states.[10]

Several authors expressed similar data concerns with time-series and cross-section data and called for new research using panel data, as I now discuss.[11]

## IV.  Modern Studies of Capital Punishment's Deterrent Effect.

Most recent studies have overcome the fundamental problems associated with national time-series and cross-section data by using panel-data techniques. Panel data are data from several units (the fifty states or all U.S. counties) over several different time

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[10] Technically, cross-sectional studies are affected by unobserved heterogeneity that cannot be controlled for in the absence of time variation. The heterogeneity is caused by jurisdiction-specific characteristics that may correlate with other variables of the model, resulting in biased, incorrect estimates.

[11]  See, e.g., Samuel Cameron, A Review of the Econometric Evidence on the Effects of Capital Punishment, 23 Journal of Socio-Economics 197 (1994) and K.L. Avio, Capital Punishment, in *The New Palgrave Dictionary of Economics and the Law* (Peter Newman, ed. 1998).

periods; that is, panel data follow a cross-section over time.  For example, a panel dataset might include data on each of the fifty states, or even on each U.S. county, for a series of years.

These improved data allow researchers to capture the demographic, economic, and jurisdictional differences among U.S. states or counties, while avoiding aggregation bias. Furthermore, panel data produce many more observations than cross-section or time-series data, enabling researchers to estimate any deterrent effect more precisely.  In addition to enjoying the benefits of panel data, recent studies have access to more recent data that make conclusions more relevant for the current environment.

Using improved data and more sophisticated regression techniques, thirteen papers have been written in the economics literature in the past decade.  Their conclusion is unanimous: all of the modern papers find a significant deterrent effect.

I now briefly discuss the modern research in the economics literature from the past decade, beginning with the studies in which I have been involved.  I group the papers into those that use panel-data techniques and those using other techniques.

**A.  Modern Papers using Panel-Data Techniques.**

1.  Hashem Dezhbakhsh, Paul H. Rubin, and I examine whether deterrence exists using county-level panel data from 3,054 U.S. counties over the period 1977 to 1996.[12]  This is the only study to use county-level data, allowing us to estimate better the demographic, economic, and jurisdictional differences among U.S. counties that can affect murder rates. Moreover, the large number of county-level observations extends the empirical tests'

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[12] Hashem Dezhbakhsh, Paul Rubin, and Joanna M. Shepherd, Does Capital Punishment Have a Deterrent Effect? New Evidence from Postmoratorium Panel Data, 5 American Law and Economics Review 344 (2003).

reliability.[13]

We find a substantial deterrent effect; both death row sentences and executions result in decreases in the murder rate. A conservative estimate is that each execution results in, on average, 18 fewer murders. Our main finding, that capital punishment has a deterrent effect, is robust to many different ways of performing the statistical analysis.[14]

2. In another paper, I use state-level, monthly panel data from 1977-1999 to examine two important questions in the capital punishment literature.[15] First, I investigate the types of murders deterred by capital punishment. Some people in the debate on capital punishment's deterrent effect believe that certain types of murder are not deterrable. They claim that murders committed during interpersonal disputes, murders by intimates, or noncontemplated crimes of passion are not intentionally committed and are therefore nondeterrable. Others argue that the brutality of executions incites criminals and increases the rates of stranger murders.

To the contrary, I find that the combination of death row sentences and executions deters all types of murders: murders between intimates, acquaintances, and strangers, crime-of-passion murders and murders committed during other felonies, and murders of African-American and white people.[16] I estimate that each death row sentence deters approximately 4.5 murders and that each execution deters approximately 3 murders.

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[13] Technically, it extends the analysis' degrees of freedom, increases variability, and reduces colinearity among variables.

[14] The deterrent effect remains with different choices of functional form (double-log, semi-log, or linear), state-level vs. county-level analysis, sampling period, endogenous vs. exogenous probabilities, and level vs. ratio specification of the main variables.

[15] Joanna M. Shepherd, Murders of Passion, Execution Delays, and the Deterrence of Capital Punishment, 33 Journal of Legal Studies (forthcoming 2004).

[16] Intimates are defined as spouses, common-law spouses, parents, children, siblings, in-laws, step-relations, and other family. Crime-of-passion murders include lovers' triangles, murders by babysitters, brawls under alcohol, brawls under drugs, arguments over money, other arguments, and abortion-murders (abortions performed during the murder of the mother).

The second important issue that I address is the impact on deterrence of execution delays. In 1996, Congress passed the Anti-Terrorism and Effective Death Penalty Act of 1996 that limits federal habeas review in capital cases. If criminals prefer lengthy death row waits to short ones, as their numerous appeals and requests for stays suggest, then shortening the time until execution could increase the death penalty's deterrent impact.

I find that shorter waits on death row increase deterrence. Specifically, one extra murder is deterred for every 2.75-years reduction in the death-row wait before each execution.

3. Hashem Dezhbakhsh and I use state-level panel data from 1960-2000 to examine capital punishment's deterrent effect.[17] This is the only study to use data from before, during, and after the 1972-1976 Supreme Court moratorium on executions. Our study advances the deterrence literature by exploiting an important characteristic that other studies overlooked: the experimental nature of the Supreme Court moratorium.

First, we perform before-and-after moratorium comparisons by comparing the murder rate for each state immediately before and after it suspended or reinstated the death penalty. These before-and-after comparisons are informative because many factors that affect crime—e.g., law enforcement, judicial, demographic, and economic variables—change only slightly over a short period of time. In addition, the moratorium began and ended in different years in different states. Considering the different start and end dates, the duration of the moratorium varied considerably across states, ranging from four to thirty years. Observing similar changes in murder rates immediately after the same legal change in different years and in various states provides compelling evidence of the moratorium's effect on murder.

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[17] Hashem Dezhbakhsh and Joanna M. Shepherd, The Deterrent Effect of Capital Punishment: Evidence from a "Judicial Experiment," (Emory University Working Paper, 2003).

The before-and-after comparisons reveal that as many as 91 percent of states experienced an increase in murder rates after they suspended the death penalty. In about 70 percent of the cases, the murder rate dropped after the state reinstated the death penalty.

We supplement the before-and-after comparisons with time-series and panel-data regression analyses that, unlike many existing studies, uses both pre- and postmoratorium data. The regressions disentangle the impact of the moratorium itself on murder from the effect of actual executions on murder; we find that the moratorium has a significant positive effect on murder and that executions have significant negative effects on murder. These estimates suggest that both adopting a capital statute and exercising it have strong deterrent effects.[18]

4. John R. Lott, Jr. and William M. Landes use state-level panel data from 1977 to 1995 to examine whether right-to-carry concealed handgun laws deter multiple-victim public shootings.[19] Included in their analysis are tests of the deterrent effect of executions on murder. The authors find that right-to-carry concealed handgun laws do result in fewer multiple victim public shootings. They also find that executions have a significant deterrent effect on the overall murder rate. Specifically, a one percent increase in the execution rate is associated with a seven percent decline in the overall murder rate.

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[18] We also confirm that our results hold up to changes in our choice of regressors, estimation method, and functional form. The deterrent variables' coefficients are remarkably consistent in sign and significance across 84 different regression models. In addition, we verify that the negative relationship between the death penalty and murder is not a spurious finding. Before-and-after moratorium comparisons and regressions reveal that the death penalty does not cause a decrease in property crimes, suggesting that the deterrent effect is not reflecting general trends in crime.

[19] John R. Lott, Jr. & William M. Landes, Multiple Victim Public Shootings, Bombings, and Right-to-Carry Concealed Handgun Laws: Contrasting Private and Public Law Enforcement, (John M. Olin Law & Economics Working paper No. 73, University of Chicago Law School, 2000)

5 and 6. Two papers by FCC economist Paul Zimmerman find a deterrent effect.[20] Zimmerman uses state-level panel data from 1978 to 1997 to examine the relationship between state execution rates and murder rates. In a second paper, he employs state-level panel data from 1978-2000 to examine which execution methods have the strongest deterrent effects. In both papers, Zimmerman finds a significant deterrent effect of capital punishment. He estimates that each execution deters an average of 14 murders and that executions by electrocution have the strongest impact.

7. H. Naci Mocan and R. Kaj Gittings use state-level panel data from 1977 to 1997 to examine the relationship between executions, commutations, and murder.[21] Again, the authors find a significant deterrent effect; they estimate that each execution deters an average of 5 murders. Their results also indicate that both commuting death-row prisoners' sentences and removing them from death row cause increases in murder. Specifically, each commutation results in approximately five extra murders and each removal from death row generates one additional murder.

8. Another recent paper by Lawrence Katz, Steven D. Levitt, and Ellen Shustorovich uses state-level panel data covering the period 1950 to 1990 to measure the relationship between prison conditions, capital punishment, and crime rates.[22] They find that the death rate among prisoners (a proxy for prison conditions) has a significant, negative relationship with overall violent crime rates and property crime rates. As expected, the execution rate has no statistically significant relationship with overall

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[20] Paul R. Zimmerman, Estimates of the Deterrent Effect of Alternative Execution Methods in the United States: 1978-2000, American Journal of Economics and Sociology (forthcoming); Paul R. Zimmerman, State Executions, Deterrence, and the Incidence of Murder, Journal of Applied Economics (forthcoming).
[21] H. Naci Mocan and R. Kaj Gittings, Getting Off Death Row: Commuted Sentences and the Deterrent Effect of Capital Punishment, 46 Journal of Law and Economics 453 (2003).
[22] Lawrence Katz, Steven D. Levitt, & Ellen Shustorovich, Prison Conditions, Capital Punishment, and Deterrence, 5 American Law and Economics Review 318 (2003).

violent crime rates (which consist mainly of robbery and aggravated assault rates) and property crime rates; that is, executions have no effect on non-capital crimes. In several estimations, both the prison death rate and the execution rate are found to have significant, negative relationships with murder rates. The deterrent effect of executions is especially strong in the estimations that control for the economic and demographic differences among states.[23]

## B. Modern Papers Using Other Techniques

9. Instead of a panel-data study, Dale O. Cloninger and Roberto Marchesini conduct a portfolio analysis in a type of controlled group experiment: the Texas unofficial moratorium on executions during most of 1996.[24] They find that the moratorium appears to have caused additional homicides and that murder rates significantly decreased after the moratorium was lifted.

10. Harold J. Brumm and Dale O. Cloninger use cross-sectional data covering 58 cities in 1985 to distinguish between criminals' perceived risk of punishment and the ex-post risk of punishment measured by arrest rates, conviction rates, or execution rates.[25] They find that the perceived risk of punishment, including the probability of execution, is negatively and significantly correlated with the homicide commission rate.

11. James A. Yunker tests the deterrence hypothesis using two sets of post-moratorium data: state cross-section data from 1976 and 1997 and national time-series data from 1930-1997.[26] He finds a strong deterrent effect in the time-series data that disappears when the data are limited to the 1930-1976 period. Therefore, he concludes that postmoratorium data is critical in testing of the deterrence hypothesis.

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[23] The authors' accompanying commentary focuses on other aspects of their results.

[24] Dale O. Cloninger & Roberto Marchesini, Execution and Deterrence: A Quasi-Controlled Group Experiment, 35 Applied Economics 569 (2001).

[25] Harold J. Brumm and Dale O. Cloninger, Perceived Risk of Punishment and the Commission of Homicides: A Covariance Structure Analysis, 31 Journal of Economic Behavior and Organization 1 (1996).

[26] James A. Yunker, A New Statistical Analysis of Capital Punishment Incorporating U.S. Postmoratorium Data, 82 Social Science Quarterly 297 (2002).

12 and 13.  Two other papers, one by Isaac Ehrlich and Zhiqiang Liu and the other by

Zhiqiang Liu, use Ehrlich's original state-level, cross-section data.[27]  The study by Ehrlich and Liu

offers a theory-based sensitivity analysis of estimated deterrent effects and finds that executions have a significant

deterrent effect.  Liu's study uses switching regression techniques in estimations that take into account the

endogenous nature of the status of the death penalty.  He also finds a strong deterrent effect.


## V.  Application of the Research to Terrorism.

To predict perfectly whether the Terrorist Penalties Enhancement Act of 2003 (H.R.

2934) will decrease terrorist acts, we would need research that focuses specifically on the

application of capital punishment to terrorists.  Unfortunately, this research does not yet

exist.  However, it is still worth discussing indirect evidence about whether terrorists, like

other potential murderers, can be deterred.

It is probable that capital punishment cannot deter some terrorists.  For example, the

death penalty would not have deterred the September 11 terrorists or suicide bombers.

Similarly, the death penalty does not deter all potential perpetrators of any type of murder; in

states with the death penalty for first-degree murder, people still commit many murders in

the first degree.

Even if the death penalty does not deter <u>all</u> terrorists, it can still have an overall

deterrent effect if it deters <u>some</u> terrorists.  Although some fanatics may not be deterrable,

the death penalty will decrease terrorism as long as there are a few potential terrorists who

prefer imprisonment to death.

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[27] Isaac Ehrlich & Zhiqiang Liu, Sensitivity Analysis of the Deterrence Hypothesis: Lets Keep the Econ in Econometrics, 42 Journal of Law and Economics 455 (1999); Zhiqiang Liu, Capital Punishment and the Deterrence Hypothesis: Some New Insights and Empirical Evidence, Eastern Economic J. (forthcoming)

Similarly, many people who commit crimes of passion may well be undeterrable. The emotion of the moment may overcome their self-control. However, my research, discussed above, shows that the death penalty has a deterrent effect on crimes of passion, taken as a group.[28] Although the death penalty may not deter all, or even most, crimes of passion, it deters some of them.

However, there may be no reduction in terrorism if the death penalty induces as much terrorism as it deters. Indeed, the application of the death penalty might conceivably induce a net increase in terrorism if many terrorists view the death penalty as a means to glorious martyrdom.

However, both research and current examples suggest that, although some terrorists are undeterrable fanatics, a substantial number do respond to incentives in the way that other potential murderers do. For example, Lott and Landes showed that potential perpetrators of multiple-victim mass shootings are deterred in states that permit citizens to carry concealed weapons; in such states, a greater chance exists that the perpetrators will be shot.[29] Likewise, many terrorists, such as Osama bin Laden and alleged bomber Eric Rudolph, attempt strenuously to avoid capture and punishment. It is possible to be a selfish, calculating terrorist.

Moreover, each instance in which an alleged terrorist or other accused murderer asks his lawyer to attempt to gain a sentence of life in prison, rather than death, is evidence that is consistent with deterrence. Many accused perpetrators fight strenuously to avoid execution; few volunteer for it. That many potential perpetrators view execution as worse than life imprisonment confirms why the existence of the death penalty would deter at least a few from committing murder.

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[28] Shepherd, *supra* note 15.
[29] Lott & Landes, *supra* note 19.

Finally, the pervasive consistency of capital punishment's deterrence of other kinds of murder suggests that capital punishment would deter at least some terrorist murders.